


# manual change transmittal

NO.

<b>TITLE</b> DIVISION OF DESIGN HIGHWAY DESIGN MANUAL FIFTH EDITION - CHANGE #5	<b>APPROVED BY</b>  KARLA SUTLIFF, Chief	<b>Date Issued:</b> 11/01//01 Page 1 of 4
<b>SUBJECT AREA</b> CHAPTERS 10, 20, 60, 80, 100, 200, 300, 400, 500, 700, 800, 900, 1000, 1100	<b>ISSUING UNIT</b> DIVISION OF DESIGN	
<b>SUPERCEDES</b> FORWARD, TABLE OF CONTENTS, CHAPTERS 10, 20, 60, 80, 100, 200, 300, 400, 500, 700, 900, 1100, INDEX - 5 <sup>TH</sup> EDITION, JULY 1995	<b>DISTRIBUTION</b> ALL HOLDERS OF THE 5 <sup>TH</sup> EDITION, HIGHWAY DESIGN MANUAL	

The Forward, Table of Contents, and Chapters 10, 20, 60, 80, 100, 200, 300, 400, 500, 700, 900, 1100, and the Index of the 5<sup>th</sup> Edition Highway Design Manual (HDM) have been revised. Additionally, corrections are made to Indices 816.6 and 818.2, and to Figure 1003.2. Please replace the affected chapters and sheets with the enclosed sheets.

All revisions are noted by a vertical line in the margin, adjacent to the paragraph, table, or figure, containing the revision. In general, all references to the various offices and departments within Caltrans and other organizations have been updated. References to the AASHTO Green Book and the Transportation Research Board's Highway Capacity (HCM) have been updated to reflect editions currently approved by AASHTO as appropriate (ie: in some cases, Caltrans chooses to reference methods described in previous editions of the HCM). These reference updates may not be depicted below, but will be noted by the vertical line in the margin. The most significant revisions are summarized below:

**FORWARD**      Update organization references and use of this Manual.

**Chapter 10**      **Organization and Functions**  
Update organizational structure and names.

**Chapter 20**      **Designation of Highway Routes**  
21.2 (1) Clarification of numbering convention language and spelling corrections

**Chapter 60**      **Nomenclature**  
General updating of references and clarification of definitions.

**Chapter 80**      **Application of Design Standards**  
82.1(1) Add paragraph: "This manual does not address temporary construction features..."  
82.2(1) Update references. Update Table 82.1A Mandatory Design Standards and Table 82.1B Advisory Design Standards, add and delete standards based on the revisions in this package.

**Chapter 100**      **Basic Design Policies**  
101.1 Update examples of sight restriction, clarify application of AASHTO design speed criteria.  
102.1 Clarify use of "Design Year Peak Hour Traffic Volumes" and who determines such.  
103.1 Design designation to be given in Project Initiation Documents, as well.  
104.2 Add reference to Index 205.1  
105.1, 105.3, 105.4 Significant re-write to reflect recent changes in design standards and policy in relation to sidewalks (new min. width), accessibility requirements, and design and placement of wheel chair ramps.  
109.3 Clarification of intent  
110.2 Revised to reflect current erosion control regulations and state of the practice.  
110.3 Revised to reflect current air pollution control standards and practices.  
110.5 New Index on Control of Noxious Weeds - Exotic and Invasive Species.  
110.8 Update threshold cost for Safety Reviews and add new items for consideration.



## **Chapter 200**

### **Geometric Design and Structure Standards**

- 201.2 Figure 201.2 and Tables 201.2A and 201.2B have been deleted. Text has been added to provide background and clarification of Passing Sight Distance.
- 201.4 Tables 201.4A and 201.4B and text references have been deleted. Figure 201.4 has been revised to graphically represent the information.
- 201.5 Tables 201.5A and 201.5B and text references have been deleted. Figure 201.5 has been revised to graphically represent the information.
- 201.6 Tables 201.6A and 201.6B and text references have been deleted. Figure 201.6 has been revised to graphically represent the information.
- 201.7 Table 201.7 has been revised, Figure 201.7 has been added, and text reflects these changes.
- 202.2 Table 202.2 has been revised for clarification. Former Figure 203.2 has been renumbered and re-titled as Figure 202.2 Maximum Comfortable Speed on Horizontal Curves, and is relocated here.
- 202.4(1) Clarification regarding undesirability of future saw-tooth sections.
- 202.4(3) Revise median width limits, from 9 m to 20 m, for superelevation axis of rotation.
- 202.5 Remove references to software, add new Figure 202.5B, perspective rendition of superelevation terms.
- 203.2 Table 203.2 minimum radius of curve values are now Mandatory Standards as is the use of Figure 201.6 when Table 203.2 does not provide adequate sight distance. Figure 203.2 relocated, see 202.2 above.
- 203.3 Clarification regarding vertical and horizontal alignment coordination.
- 203.5 Additional guidance regarding undesirability of compound curves and exceptions permitting them.
- 203.9 Added guidance on preferred max of 10% superelevation for structures.
- 204.1 Clarification of vague language.
- 204.2 Clarification of grade line placement and effects on cross section.
- 204.3 Guidance regarding minimum grade requirements.
- 204.6 Formerly Index 204.7. Relocated for consistency. Former 204.6 now 204.8
- 204.7 Formerly Index 204.8. Relocated for consistency.
- 204.8 Formerly Index 204.6.
- 205.1 Reword for clarity and add New Advisory standard for access openings relative to median openings.
- 205.3 Update where access width is measured, consistent with Standard Plan A87.
- 208.1 Clarify minimum mandatory bridge width standards.
- 208.10 Update text and figures to reflect new terminology of Barriers and Railings, new types and uses.
- 209 Update and clarification with references to Index 835.3 in 209.2 and 209.3
- 210 Revised organizational references and added/revised recognized retaining systems.

## **Chapter 300**

### **Geometric Cross Section**

- 301.1 Add guidance for off-tracking width.
- 301.2 New *General* paragraph with references for hydroplaning considerations. New Advisory Design Standard for differences in cross-slope at entrance and exit gores.
- 302.1 Table 302.1 notes revised for clarification and consistency in application.
- 302.2 Significant revision: Revised to allow a range for shoulder cross-slope, provided certain criteria are met.
- 304.1 Significant revision of text providing clarification and additional guidance for safety and erosion control. Side slopes steeper than 1:4 now require approval of the District Landscape Architect.
- 304.3 Clarification of uses.
- 304.4 Guidance on importance of contour grading added.
- 304.5 Note added to reapply topsoil.
- 305.1 Clarification and add New Advisory Design Standard for "soft barrier" at climbing or passing lanes.
- 307.2 Figure 307.2 has been revised for clarification, and consistency with Figures 307.4 and 307.5.
- 307.3 Significant new guidance regarding RRR projects has been added from DIB 79. Figure 307.3 revised. At this time, DIB 79 will remain a separate guidance document for RRR projects due to their special nature.
- 307.4 Figure 307.4 has been revised for clarification, and consistency with Figures 307.2 and 307.5.
- 307.5 Figure 307.5 has been revised for clarification, and consistency with Figures 307.2 and 307.4.
- 309.1 Clear Recovery Zone guidance is enhanced regarding cross slopes, fixed objects, and Mandatory Design Standard minimum clearances to walls and noise barriers.
- 309.2 Clarification of Mandatory Design Standard minimum vertical clearances and addition of New Table 309.2A listing these standards. Department of Defense Rural Interstates and Single Routing in Urban Areas replaces and updates the former 42 000 km Priority Network, revised map and Table 309.2B.
- 309.3 Advisory Design Standard removed, tunnel clearances now refer to 309.1.
- 309.4 Background guidance for the standard is provided.

- 310.1 Additional guidance on relinquished facilities has been added.

## **Chapter 400**

### **Intersections at Grade**

- 401.5 Reference to Topic 105
- 403.3 Additional guidance on angled intersections. Revises Advisory Design Standard for intersection angles to a preferred 90 degrees, with a new minimum of 75 degrees. Figure 403.3 revised to reflect the changes.
- 404 Improved guidance regarding large vehicle off-tracking, design vehicles and the use of truck turn templates. Corrections to Figure 404.2 STAA Design Vehicle dimensions.
- 405.1 New recommendation for use of 600 mm object (headlight) height for determining sight distance when a median barrier is present. Add references to Index 205, delete Table 405.1B and refer to Table 201.7
- 405.2 (a) Add reference to Index 209.3, (c) new guidance for 18 m taper, (d) recommendation to consult District Traffic in restrictive urban areas. Revise and clarify Table 405.2A and Figures 405.2A-C, revised notes point out the existing requirement for design exceptions for deviations in restrictive conditions
- 405.6 Add reference to Index 205.1
- 405.9 Figure 405.9 has revised taper length criteria and revised notes point out the existing requirement for design exceptions for deviations in restrictive conditions.
- 407 Revised guidance on truck turn templates and their use, all new figures.

## **Chapter 500**

### **Traffic Interchanges**

- 502.2 Single Point Interchange text revised to include reference to the new SPI Guidelines.
- 504.2 Former Figure 504.2A is now 504.2A and 504.2B, separating entrance and exit figures for clarity, former Figure 504.2B is now 504.2C, all references revised accordingly. The gore area is defined (5), and "valley gutter" is replaced by "drainage feature" (5)(a).
- 504.3 (1) (b) defines radial dimension.
- 504.3(2) New Index: All design guidance in The Ramp Meter Design Manual has been incorporated into this portion of the HDM. Significant new language and eight (8) new figures have been added. Subsequent parenthetical sub-headings and figure designations have been revised to reflect this addition.
- 504.5 Revised guidance for considering auxiliary lanes at entrance ramps.
- 504.7 Weaving analysis methods have been revised to exclude the former ITS, Berkeley method, and notice is given that the volumes used to calculate weaving are to be unconstrained by metering, regardless of whether metering will be used.
- 504.8 New Mandatory Design Standard requires access control be acquired opposite a ramp terminal, figures appropriately revised.

## **Chapter 700**

### **Miscellaneous Standards**

- 702.1 Add NCHRP citing.
- 705 Revised guidance on fencing materials and colors for steel bridges.
- 706 New Index 706.1 Roadside Management provides guidance on the long term maintenance costs of designs as well as their affects on the safety of highway construction and maintenance crews. Subsequent subheadings revised, and new guidance provided on soil sterilants, irrigation, and water line requirements.
- 707 Revised guidance on slope treatment under structures regarding long term maintenance costs, erosion, planting survivability, drainage accommodation, and listing of units to consult for assistance.

## **Chapter 800**

### **Highway Drainage Design -errata for May 2001 publication**

- 816.6(1) Correct formula: intensity should be raised to the  $2/5$  power -  $i^{2/5}$ .
- 818.2 3<sup>rd</sup> paragraph, add missing end of last sentence: "...happen is usually so costly that it may not be justified."

## **Chapter 900**

### **Landscape Architecture**

- 901.1 Revised office and division names and revised program responsibilities.
- 901.2 Add "and other roadside features".
- 902.1 Revised guidance providing clarification for highway planting and replacement planting, vegetation viewed by pedestrians, clustering and placement of irrigation components, and encouragement of native species.

- 902.3(2) Discourages regular ongoing maintenance remove reference to untested species as permissible, discourage trees susceptible to disease and which sucker to grow
- 902.3(4) Significant new guidance regarding conditions under which trees might be permitted in the median of a conventional highway
- 902.3(5) Vine planting recommended to discourage graffiti and soften appearance of noise barrier walls.
- 902.3(6) Vines not to be used where they will grow onto structures and obscure inspection of facilities.
- 902.4(1) Remove references to pedestrian areas for component security measures, remove reference to plant growth damaging components and direct that components be placed away from gores, narrow areas, etc.
- 902.4(2) Add spacing requirement for individual watering, remove overhead sprinkler option for trees and shrubs and require basin water, requirements for sprinkler protectors.
- 902.4(3) Controllers to be in enclosures, visible to oncoming traffic and away from shoulders.
- 902.4(4) Backflow preventers required in enclosures.
- 902.4(5) New Index on booster pump systems.
- 903.1 Design Reviewers and Project Development Coordinators to be involved in design of on and off ramps.
- 903.2 Clarification and guidance on safety, who develops the rest area site plan, and preservation of vegetation during construction.
- 903.5(1) Emphasis on the requirement to meet current minimum design standards for entrance and exit ramp geometry on all rest area parking area or ramp rehabilitation projects.
- 903.5(2) Rest areas to be accessible, reference Index 105.3.
- 903.5(3) Remove reference to economics suggesting more than one type of barrier.
- 903.5(4) Add guidance on crew rooms and CHP facilities, require comfort stations to be within 100m of parking.
- 903.5(5) Clarification of Engineering Services units' involvement in water supply development.
- 903.5(6) Remove reference to certification and site approval from FHWA.
- 903.5(7) Update references for number and types of phones and allow provision of a CHP office phone.
- 903.5(8) Accessible table required near comfort facilities.
- 903.5(9) 2.4 m walkway width is now a minimum, tree well size is defined.
- 903.5(10) Shelter is relative to the number of shade trees.
- 903.5(12) New sentence on dumpsters.
- 903.5(14) Changes in authority over display area and vending policies.

**Chapter 1000**    **Bikeway Planning and Design - errata for February 2001 publication**  
1003.2    Correct misspelling of AREAS in Case (4)

**Chapter 1100**    **Highway Traffic Noise Abatement**  
1101.2    Change "sound attenuation" to "noise attenuation", and "sound barriers" to "noise barriers"  
1102.5, .6, .9    Office name updates.